National Institute of Environmental Health Sciences

Climate variables as predictors of basal metabolic rate: New equations

Author(s): Froehle AW
Year: 2008
Journal: American Journal of Human Biology : The Official Journal of The Human Biology Council. 20 (5): 510-529

Abstract:

Estimation of basal metabolic rate (BMR) and daily energy expenditure (DEE) in living humans and in fossil hominins can be used to understand the way populations adapt to different environmental and nutritional circumstances. One variable that should be considered in such estimates is climate, which may influence between-population variation in BMR. Overall, populations living in warmer climates tend to have lower BMR than those living in colder climates, even after controlling for body size and composition. Current methods of estimating BMR ignore climate, or deal with its effects in an insufficient manner. This may affect studies that use the factorial method to estimate DEE from BMR, when BMR is not measured but predicted using an equation. The present meta-analysis of published BMR uses stepwise regression to investigate whether the inclusion of climate variables can produce a generally applicable model for human BMR. Regression results show that mean annual temperature and high heat index temperature have a significant effect on BMR, along with body size, age and sex. Based on the regression analysis, equations predicting BMR from body size and climate variables were derived and compared with existing equations. The new equations are generally more accurate and more consistent across climates than the older ones. Estimates of DEE in living and fossil humans using the new equations are compared with estimates using previously published equations, illustrating the utility of including climate variables in estimates of BMR. The new equations derived here may prove useful for future studies of human energy expenditure.

Source: http://dx.doi.org/10.1002/ajhb.20769

Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Meteorological Factors, Temperature, Other Exposure

Other Exposure: heat index

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location:

resource focuses on specific location

Global or Unspecified

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Other Health Impact

Other Health Impact: decreased basal metabolic rate

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified